REMARKS

Reconsideration and allowance of the subject application are respectfully requested.

The specification is amended to correct minor errors and to conform the application with current U.S. patent practice. Further, new apparatus claims 16-23 are added directed to a base station node that do not use means plus function language and thus are not subject to interpretation under 35 USC §112, 6th paragraph.

Claims 1, 2, 4, 6-9, 11, and 13-15 stand rejected under 35 USC §103 as being unpatentable over U.S. 2004/0082356 to Walton. This rejection is respectfully traversed.

Walton describes a MIMO wireless local access network system that uses a channel structure with a number of configurable transport channels supporting multiple rates and transmission modes which are configurable based on channel conditions and user terminal capabilities. As explained in paragraph [0057], the MIMO WLAN system supports four transmission modes including SIMO, diversity, beam-steering, and spacial multiplexing. As further explained in paragraph [0059], the transmission modes available for use in the uplink and downlink for each user terminal depend on the number of antennas used at the user terminal. In contrast to the claimed technology, Walton focuses on selecting particular transmission rates and transmission modes for a particular user terminal for transmission in a current scheduling interval. See for example claim 1 of Walton. The claims are directed to achieving improved performance MIMO communication by dividing user terminals into two groups and optimizing communication with respect to the first group of one or more users while at the same time using network resources in an efficient way for the other users in the second group. As explained in the non-limiting example embodiment in the specification, the first group of UEs is optimized with respect to particular channel state information (CSI), for example with a single value

decomposition (SVD) of the channel matrix. By adapting the transmission and possibly power allocation parameters of different streams in the second group based on the channel state information obtained for the user(s) in the first group, performance improves for all of the users in the first and second groups as compared to transmitting just the data for which the communication is optimized. The non-limiting example embodiment employs SVD to optimize communication with one or more users in the first group while opportunistic MIMO communication is used advantageously for communication with other users in the second group.

The Examiner maps the first set of user terminals onto Walton's user terminal 120y and the second set of user terminals on user terminal 120x as shown in Figure 7. The Examiner maps the claimed first principle suitable for optimizing communication with the first set of user terminals onto the user terminal 120y performing singular value decomposition (SVD). The claim first communication parameters are mapped to spacial multiplexing. Presumably, the Examiner is interpreting a transmission mode corresponding to spacial multiplexing as a first communication parameter for a first set of user terminals.

The Examiner maps the second communication parameters for the second set of terminals to "diversity," presumably a diversity mode of operation. The Examiner also maps the claimed second principle also onto diversity. But the Examiner does not identify what communication parameters selected by the first set of user terminals are responded to in adapting the second communication parameters for the second set of user terminals according to the second principle. Instead, the Examiner argues that "it would be obvious to change the second communication parameters after the first communication parameters." It is not understood how this quoted language addresses what is actually claimed. Nor is it clear *why* this would be done or *where* this would be done in Walton's system. Again, Walton's system is directed to selecting a single

user terminal, a rate for the terminal, a transmission mode for the terminal, and a scheduled time interval for transmission. (See claim 1.) How are physical layer communication parameters for a second different set of user terminals adapted in response to physical layer communication parameters selected for the first different set of user terminals in Walton?

Applicants also request that the Examiner explain how the same diversity mode can be as both the claimed second principle as well as the claimed second physical layer communication parameters which are different from each other. The principle refers to the communication principle used, e.g., SVD-based-MIMO or opportunistic-MIMO. The physical layer communication parameters refer to transmission parameters which would be or are used for the communication principle. If SVD-based MIMO is used to a user as a first communication principle, for example, one must use transmit weights, as physical layer communication parameters, given by an SVD of the corresponding channel matrix. If opportunistic MIMO is used as a second communication principle, for example, one must adapt the modulation and coding scheme (the rates) as physical layer communication parameters.

The Examiner admits that Walton fails to teach that each of user terminals has communication parameters adapted according to respective principles. Nevertheless, the Examiner asserts that Walton discloses that spatial multiplexing can be used with a multi-antenna user terminal while diversity is used with a single antenna user terminal. Based on these two different transmission modes, the Examiner asserts that it would be obvious to use a different number of antennas in each user terminal "effectively using different communication parameters for each terminal, based on cost considerations, safety issues, and other factors." Paragraph [0052] relied on by the Examiner for this conclusion simply states that the number of antennas employed in a user terminal depends on various factors such as those cited by the

Examiner. There is no teaching by Walton in this paragraph of each user terminal "effectively using different communication parameters" "based on cost considerations, safety issues and other factors."

Regarding claim 3, the Examiner admits Walton fails to describe that the second principle uses opportunistic MIMO communication. The Examiner relies on the Dong reference. There are multiple reasons why it would not have been obvious to combine the opportunistic MIMO teachings of Dong with the Walton system to "maximize total system capacity." First, even though SVD-MIMO and opportunistic MIMO have been known for almost 10 years, they have not been combined as claimed. The inventors of the schemes proposed by Walton and Dong probably considered them to be near optimal with respect to the assumptions they have chosen. For example, while SVD-MIMO with waterfilling is capacity optimal, it is only optimal when considering one user. Opportunistic-MIMO is nearly capacity optimal. But it is only nearly optimal when considering a large number of users. The natural extension of SVD-MIMO is not towards what is claimed, but rather to extend the SVD-MIMO scheme that is based on adjusting the matrix weights for diagonalizing the MIMO channel to multiple users. One would then choose a sender weight matrix and a suitable receiver weight matrix for each receiver such that some overall performance measure would be maximized. This normally does not provide orthogonal channels. For opportunistic MIMO, the assumption is that the cells are planned and ensure that there are a large number of users most of the time.

When SVD-MIMO and opportunistic MIMO are combined according to claim 3, the resulting performance exceeds that of the better of the two schemes. As a result, good performance is provided in situations with more than one user but less than a very large number of users. None of this is addressed in Walton or Dong.

Nor do Walton and Dong use SVD-MIMO for a slow moving user and opportunistic MIMO for fast moving users. Doing so enables slow feedback for the feedback resource demanding SVD-MIMO (due to the slow channel variation but high amount of information in channel transfer functions, i.e., CSI).

Thus, it would not have been obvious to combine the opportunistic MIMO teachings of Dong with the Walton system. Likewise, it would not have been obvious to combine Balachandran's teaching of selecting user terminals depending on traffic and quality of service parameters with Walton (see claim 5 rejection).

For the reasons set forth above, the application is in condition for allowance. An early notice to that effect is earnestly solicited.

Respectfully submitted,

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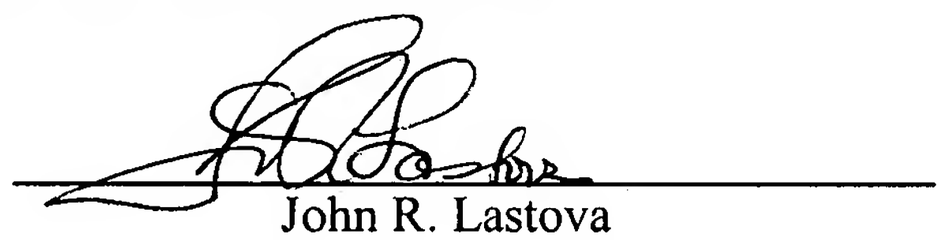
By: 

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